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METHOD AND SYSTEM FOR PROVIDING BACKUP MESSAGES TO WIRELESS DEVICES DURING OUTAGES

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PRIORITY STATEMENT
UNDER 35 U.S.C. § 119 & 37 C.F.R. § 1.78

[0001] This non-provisional application claims priority based upon prior U.S. Provisional Patent Application Serial No. 60/456,341 filed March 20, 2003 in the names of Michael I. Rosenfelt and Satin Mirchandani, entitled "Method and System for Providing Backup Messages to Wireless Handheld Devices During Unplanned Outages."

BACKGROUND OF THE INVENTION

Technical Field of the Invention

[0002] The present invention relates generally to a method and system for processing email on a wireless device at times when email service to such device is otherwise not available. More particularly, the present invention provides for backup service to a wireless device during an outage, notifies users that alternative access is available to said email, and restores messages received during the outage into the users' original email system to maintain the integrity and continuity of the email file.

Background of the Invention

[0003] Individuals and companies are increasingly relying on wireless devices for the seamless delivery of email. Such devices provide users with access to email in a mobile environment. However, most wireless devices are dependent for their operation on the

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underlying health of the company's corporate email system as well as the wireless hardware and software platforms, such as the Blackberry Enterprise Server (BES), Microsoft PocketPC, or others, necessary to synchronize the wireless capabilities together with the corporate email system. If either the company's corporate email system is out of service, or the hardware or

5   software connections are out of service, the wireless device will be unable to receive email messages.

[0004] To provide users with continuous service in the event of an outage, a company may elect to replicate its entire email system, such as a Microsoft Exchange database, in a remote datacenter on hardware similar to that owned by the company. Because of the complexity of

10   such system, such as Microsoft's Exchange architecture, replication strategies have focused on real-time database replication of disks at the byte level or, alternatively, on transferring offline database backups on a server-by-server basis.

[0005] Even in cases where a company implements complete replication of its databases, it would not be uncommon for there to be gaps in email continuity due to, for example, database

15   corruption, the presence of viruses, denial of service attacks, security breaches and other factors. Some of the most often cited problems with replication are:

     1.   High Cost. The cost involved in replication can be staggering. In order to implement an effective replication system, the company must purchase third party replication software, acquire network bandwidth, secure server capacity, retain

20   administrative support and then monitor each of these systems.

     2.   Replication of Only a Subset of the Servers. As a result of the costs inherent in providing a replicated database, such as, for example, the cost of hardware,

software, bandwidth and support personnel, it is common for only a few of the most critical servers to be replicated.

3. <u>Database Corruption</u>. Because replication technology by its very nature mirrors the files from one server onto another, a corrupt file on the original server will be mirrored in its corrupt form on the backup server. There is currently no efficient means for preventing the mirroring of corrupt files.

4. <u>Incapacitation Due to Virus</u>. Similarly, if a virus occurs in a file on the original server, it will be transported to the second server. Server corruption due to viruses can cause email outages for days.

5. <u>Transactional Inconsistency</u>. Because replication solutions typically perform byte-level replication of the disks, they do not provide integrity for the Exchange transaction boundaries. For example, a single transaction on Microsoft Exchange may consist of ten sequential writes to the disk. If the replication software has only replicated eight of those ten at the time of an outage, then the backup will be incomplete, resulting in a corrupt file which may fail to mount.

6. <u>No Vendor-Supported Replication Solution</u>. Currently no system that replicates systems like the Microsoft Exchange database is readily available at an economical price.

7. <u>Complexity of Replication</u>. The complexity of making an efficient, effective replication solution causes the system to be more prone to failure and thereby require greater resources to maintain.

[0006] For all of these reasons the existing technology fails to provide an adequate method for processing email to a wireless device during an outage. There is a need, therefore, for an improved method and system for providing email messages to a wireless device during an outage.

SUMMARY OF THE INVENTION

[0007] The present invention relates generally to a method and system for providing email to a wireless device during an outage and substantially departs from the conventional concepts and designs of the prior art. More particularly, the present invention comprises the steps of managing users' email on said users' wireless device; redirecting email messages from a primary server to a secondary server when said primary server is unavailable; notifying said users that the redirection of email messages has been implemented; providing the users with access through their wireless device to the email addresses on a secondary server while the primary server is unavailable; notifying users when the primary server is again available; and incorporating the email messages received while the primary server was unavailable into the software for managing users' email so as to create a complete email history.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The disclosed invention will be described with reference to the accompanying drawings, which show important sample embodiments of the invention and which are incorporated in the specification hereof by reference, wherein:

5   FIG. 1 is a diagram of a typical prior art wireless handheld system;

FIG. 2 is a diagram showing the preferred method of the present invention for providing email to a wireless device during an outage;

FIG. 3 is a flow diagram showing the activities occurring during an outage;

FIG. 4 is a flow diagram showing a method of intercepting messages sent to the corporate

10   email system;

FIG. 5 is a flow diagram showing alternative methods for messages to reach a wireless device;

FIG. 6 is a flow diagram showing the preferred method of synchronizing information; and

15   FIG. 7 is a flow diagram showing an alternative method for providing email messages to wireless devices.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENTS OF THE INVENTION

5   [0009] The numerous innovative teachings of the present application will be described with particular reference to the presently preferred exemplary embodiments. However, it should be understood that these embodiments provide only a few examples of the many available embodiments and advantageous uses of the innovative teachings described herein. In general, statements made in the specification of the present application do not necessarily delimit any of

10   the various claimed inventions. Moreover, some statements may apply to some inventive features, but not to others.

[0010] FIG. 1 is a diagram of a typical operating environment for a wireless device. The customer operates its legacy email system **102** within the confines of its company site **100**. In connection with the legacy email system, the company will also use wireless software **101** such

15   as, for example the Blackberry Enterprise Server (BES) software, PocketPC software or others. Email messages are received and processed through the company's email system **102** using the wireless software **101**. When email messages are intended to be directed to a wireless device **105**, they are sent through wireless hardware **103** to a wireless gateway **104** for delivery to the wireless device **105**. The wireless hardware **103** could be, for example, any infrastructure set up

20   for the delivery of messages through a wireless gateway. The wireless gateway **104** could be, for example, a gateway such as that commonly available through GoAmerica, Cingular, or others. The wireless device could be, for example, a personal data assistant (PDA), such as a Blackberry device, a cellular phone, a pager or other device capable of wirelessly receiving email messages.

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[0011] Some companies may elect to implement a backup system **106** for purposes of creating a replicated email system. In such cases, email messages are initially directed to, received by and processed on the email system **102**. The information from the email system **102** is replicated on the backup system **106**. The replication process can occur at the byte level, the

5   file level or the disk level. In some cases, the replication system is configured such that only files or disks to which changes have been made are replicated. In the event of an outage of the primary email system **102**, the backup system **106** is activated. However, because the email system **102** and the backup system **106** do not act in concert, it is necessary to take the email system **102** completely off line before activating the backup system **106**. Moreover, it is not

10   possible to test the efficacy of the replication system by transferring only a few users from the email system **102** to the backup system **106**. Also, because of the complexities in transferring from the email system **102** to the backup system **106**, it can take as long as 30 to 60 minutes to complete a transfer at the time of the outage. Moreover, the backup email system **106** is fully integrated with the wireless software **101** and the wireless hardware **103**, the backup system **106**

15   will not have the functionality required to deliver email messages to the wireless device **105**.

[0012] FIG. 2 shows a diagram outlining the preferred method for processing email during an outage. In normal operating environment, email messages **201** are directed to a corporate server gateway **202**. If there are no outages or other reasons why the primary email system **102** may be down, email messages **201** are directed to the primary email system **102**.

20   From there, email messages **201** directed to the primary wireless hardware **103** for processing through the wireless gateway **205** and on to the respective users.

[0013] In those cases where there is an outage or the primary email system **102** is otherwise unavailable, email messages **201** are redirected from the primary email system **102** to a secondary email system **206**. Users are notified that email messages **201** have been redirected and those users are provided access to their email messages **201** through the secondary email

5   system **206**. Users are again notified when the primary email system **102** is available. Once email messages **201** are received at the secondary email system **206**, they are passed through the secondary wireless hardware **207** to the wireless gateway **205** and on to the users. It is important to note that the primary wireless hardware **103** may be, but need not be, distinct from secondary wireless hardware **207**. However, it may be beneficial to have primary wireless hardware **103**

10   separate from secondary wireless hardware **207** in cases where primary wireless hardware **103** is physically located adjacent to primary email system **102**.

[0014] In an exemplary embodiment of the invention, email messages **201** are sent to a server gateway **202**. In a corporate environment, email messages may be sent from customers, vendors, partners, suppliers and the like. In a typical environment, email messages are routed to

15   an email application residing on the primary email system **102**. The registry of all email addresses residing on the primary email system **102** is kept either on the primary server used in connection with the primary email system **102** or on the corporate server gateway **202**. In some cases, the method of determining the email addresses that reside on the primary email system **102** utilizes functionality inherit within the email application. In other cases, the method of

20   determining the email addresses that reside on the primary email system **102** may be an independent program operating autonomously.

[0015] Next, email addresses that are redundant to the email addresses residing on the primary email system **102** are created on the secondary email system **206**. The secondary email system **206** can be located remotely from the corporate server gateway **202** and may be connected, for example, through the Internet. In most cases, a message will be employed

5   whereby the email addresses on the secondary email system **206** will be updated on a periodic basis to replicate the email addresses on the primary email system **102**. This creation of redundant email addresses on the secondary email system **206** is continued on an ongoing basis.

[0016] A method is next employed to detect whether email addresses that reside on the primary email system **102** are detectable to email messages **201**. In some cases, this detection

10 can be as simple as monitoring the email flow for error messages indicating a delivery failure. In other cases, an automated method may be employed which continually monitors a flow of messages **201** to determine whether they are received by the primary email system **102** as intended.

[0017] As such time as the email addresses that reside on the primary email system **102**

15 not detectable to email messages **201**, the email messages **201** are redirected from the primary email system **102** to the secondary email system **206**. The transition from the primary email system **102** to the secondary email system **206** occurs once it has been determined that the email addresses on the primary email system **102** are not being detected by email messages **201**. It is also possible to direct only a portion of the email messages **201** from the primary email system

20 **102** to a secondary email system **206** in cases where only a portion of the email addresses residing on the primary email system **102** are undetectable to email messages **201**. Similarly, a decision may be made to transfer all email messages from the primary email system **102** to the

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secondary email system **206** even though only a portion of the email addresses on the primary

email system **102** are undetectable to email messages **201**. In this may be useful, for example, in

those cases where it appears that the primary email system **102** may be prone to additional

failure. It may also be desirable in those cases where the transition from the primary email

5   system **102** to the secondary email system **206** is performed manually, to implement a password

protection scheme whereby ability to effectuate the transition requires the entering of a

password.

[0018] At the time, or immediately after, email messages **201** have been redirected to the

secondary email system **206**, a notification is sent to users alerting them that email messages on

10   the secondary email system **206**. The notification method may consist, for example, the

automated delivery of notification messages through an alternate email address for each of the

users. Alternatively, an automated message may be sent to each of the users whereby the users

receive the message on their wireless device. The notification messages can also be sent to, for

example, cellular telephones, pagers and the like. Each of the users will then have access to the

15   secondary email system **206** through their wireless device.

[0019] During the period that email messages **201** are directed to the secondary email

system **206**, continual assessment may be conducted to determine whether email addresses,

residing on the primary email system **102**, are again detectable to email messages **201**. This

activity may take the form of, for example, periodically pinging the email addresses residing on

20   the primary email system **102** and evaluating whether a response is received.

[0020] Once the primary email system **102** is again available, email messages **201** that

had been directed to the secondary email system **206** can be redirected back to the primary email

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system **102**. At that time, users can be notified that the primary email system **102** is again operational and that their primary email system **102** is functioning. The notification to users can again be in the form of a notification message delivered to each user's wireless device.

[0021] Once email messages **201** are successfully redirected to the primary email system

5 **102**, email messages **201** that had been received on the secondary email system **206** during the outage can be synchronized in the user's primary email application thereby creating a comprehensive email history within that application. It is important to understand that in the preferred embodiment there is no need to take the primary email system **102** completely offline in order to test the efficacy of the secondary email system **206**. In addition, there is no

10 significant cost inherent in testing the efficacy or functionality of the secondary email system **206**. In addition, the ability to transfer only a portion of the email addresses residing on the primary email system **102** to the secondary email system **206** provides a tremendous benefit. For example, if only a limited number of email addresses residing on the primary email system **102** are affected, then only the email messages **201** intended for those email addresses can be

15 redirected to the secondary email system **206**. In another example, after an outage has occurred, it is possible to redirect the email messages **201** back to the primary email system **102** on a limited basis to test the viability of the primary email system **102** without the need to transfer all of the addresses on the secondary email system **206** to the primary email system **102**. Also, redirecting email messages **201** from the primary email system **102** to the secondary email

20 system **206** can be effectuated in less than 2 minutes compared to the 30 to 60 minutes required in traditional replication systems.

[0022] FIG. 3 is a flow diagram showing the activity occurring before an outage, during an outage and after an outage. Initially, the user will operate the wireless device in a normal mode **301**. The user will be unaware that a redundant system is in place. Before an outage occurs, the user will install client software on the user's wireless device **302**. The client software

5 application will be similar in functionality to the normal inbox that occurs on the user's wireless device when they view email. The purpose for the client software is that it connects directly to the secondary email system **206** instead of to the company's primary email system **102**. The client software remains unused and transparent to the user until the secondary email system **206** is activated.

10 [0023] During a full or partial outage, the secondary email system **206** is activated **303**. A notice is sent to users alerting them of the outage **304**. The user then opens the client software and accesses their email **305**. The user will have the ability to send and receive email messages through their existing email address on their wireless device. In addition, the users will have access to their contacts and calendar through their wireless device.

15 [0024] After the outage has been terminated, the primary email system is reactivated **306** and the secondary email system is deactivated **307**. A notice is sent to the user alerting them that the outage is over **308**. Messages that were received into, and sent from, the secondary email system **206** are then synchronized with the primary email system **309**. User then returns to operating the wireless device in its normal mode **301**.

20 [0025] FIG. 4 is a diagram showing the locations within a mail stream in which a email message **201** could be intercepted and redirected to a secondary email system **206**. For example, when an email message **401** is in transit through the general mail stream service **402**, the email

message **201** may be intercepted as part of an independent service offering. In such a circumstance, customers could list the simple mail transfer protocol (SMTP) address of this independent service contained within the email message **201**. During normal operation, the SMTP address is transparent to the system and email is delivered to the primary email system

5   **102** without interruption. In the event of an outage of the primary email system **102**, the independent service intercepts messages containing the SMTP address and directs those messages to a wireless device. This independent service then receives the incoming mail stream through the email message **201**, redirect messages as appropriate and forward the rest of the mail stream to the primary system. Upon an outage of the primary email system **102**, email messages,

10   such as email message **201**, would continue to point the secondary email system **206** which would accept such messages and redirect them to the designated wireless device. By intercepting the email message **201** at this location, it is possible to provide protection against the failure of all customer hosted facilities such as, for example, the customer's mail system or gateway.

15   [0026] Another location where the email message **201** could be intercepted and redirected is at the customers' mail stream service **403**. Functionality of the customer's mail stream service **403** would be similar to that described for the general mail stream service **402**. However, the customer's mail stream service **403** would be located behind the corporate firewall **407**. The customer's mail stream service **403** would provide that inbound SMTP messages

20   would be redirected directly to wireless devices or to an offsite service which could then forward the messages to the appropriate wireless device. Redirecting the email message **201** through the customer's mail stream service **403** would provide protection against the failure of the primary

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email server or the wireless gateway, but could require additional hardware in order to host the customer's mail stream service application.

[0027] Yet another location for intercepting and redirecting an email message **201** is at the inbound internet mail connector (IMC) **404** in the primary email system **102**. As will be understood by those skilled in the art, the IMC **404** is often on a separate server from the primary email system **102**. Accordingly, upon an outage of the primary email system, it would still be possible to redirect email messages from the IMC **404**.

[0028] Another location in which email messages could be redirected is within the primary mail system itself. For example, in the event of an outage causing portions of the primary email system **102** to be operational and other portions not to be operational, the message routing functionality of the primary email system would be modified on a real-time basis so as to redirect messages from mail boxes that are not operational within the primary email system **102** to the backup email system **206**.

[0029] It should be noted that it may be necessary at times to redirect the email message **201** from the primary email system **102** to the secondary email system **206**. At other times, it may be necessary to redirect the email message **201** from the secondary email system **206** to the primary email system **102**. For example, in the case of an outage of the secondary email system an alternate or backup entry can be placed in the email message **201** instructing that the email message **201** be redirected from the secondary email system **206** to the primary email system **102**.

[0030] Another method for redirecting an email message **201** within the present invention is to redirect an email message down an alternate path at the time the primary email

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system **102** is unavailable using, for example, an event sync within an email application such as Microsoft Exchange designed to inspect message traffic and alter or copy that message to another destination. Yet another method of redirecting email messages is to redirect all messages with a lower priority designation to a separate SMTP host during an outage of the

5   primary email system **102**. Yet another method of redirecting email message **201** is to change the domain name system (DNS) identifier of the primary email system **102** at the time of the outage of the primary email system **102** such that inbound email messages, such as email message **201**, are redirected to an alternate facility.

[0031] FIG. 5 is a diagram showing methods by which a secondary email system **206** can

10   deliver messages to a wireless device **105**. Once messages are routed to an alternate location, they can be delivered to wireless devices in a number of different ways. For example, the secondary email system **206** can forward messages to a wireless device **105** using non-SMTP delivery **503** such as short messaging service (SMS) or native device addressing. In particular, for devices capable of receiving more than one type of data feed, a mapping can be kept of an

15   alternate method to deliver text messages to those devices. In the event of an outage of the primary email system, messages can be sent through this alternate protocol.

[0032] The secondary email system **206** can also forward messages to wireless device **105** through use of SMTP delivery to alternate email addresses **504**. In this case, the alternate email addresses map to the wireless device **105**. When the primary path to deliver the email

20   message **201** to the wireless device **105** fails, the email message **201** can be forwarded to that device's alternate address.

[0033] As another alternative, the wireless device 105 can "pull" messages from the secondary email system 206 using protocols such as pop3 or imap4. The wireless device 105 would be instructed to pull messages in the event of an outage of the primary email system 102.

[0034] As another alternative, upon an outage of the primary email system 102, email message 201 can be routed to wireless device 105 using non-SMTP, device specific addressing.

[0035] FIG. 6 is a diagram of a method for synchronizing information regarding wireless device users and other critical information. Regardless of the location of the secondary email system 206, having critical information from the primary email system 102, the wireless gateway 205, or both, is critical. This is accomplished through a wireless device information synchronization application 601 that synchronizes with the primary email system 102 and the wireless gateway 205 to extract information critical to the redirection of email messages at the time of an outage of the primary email system. Information to be synchronized includes, for example, a list of wireless device users, email addresses, device identification information, incription keys, preferences and wireless platform. This information is sent to the secondary wireless message delivery system 602 that receives the inbound SMTP stream during an outage of the primary email system and that performs the redirection with the assistance of the information provided.

[0036] FIG. 7 is a diagram showing the method for routing email to wireless devices by redirecting to an alternate infrastructure. Through this methodology, the secondary email system 206 and secondary wireless hardware 207 are located in a separate location from the primary email system 102 and the primary wireless hardware 103. Upon a failure of the primary wireless hardware 103, the primary wireless hardware 103 would be disconnected from the wireless

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network and a new session initiated by the secondary wireless hardware **207**. The secondary wireless hardware **207** is configured to connect to the primary email system **102** if it is still operational.